

CLAIMS

1. A sealant composition for a plastic liquid crystal display cell, comprising:

an epoxy resin composition, wherein

(I) an aqueous solution obtained by mixing the composition and 10 times by weight of pure water at from 40 to 80°C has an ionic conductivity of 1 mS/m or less, and

a cured product of the composition has

(II) a water vapor permeability at 60°C passing a cured film of the composition having a thickness of 100 μm of less than 200 $\text{g/m}^2 \cdot 24\text{hrs}$,

(III) a heat deformation temperature (T_g) of a cured product of the composition in a range of from 0 to 85°C, and

(IV) a storage modulus under room temperature of a cured product of the composition in a range of from 0.5×10^4 to 1×10^6 Pa.

2. The sealant composition for a plastic liquid crystal display cell of claim 1, wherein the epoxy resin composition has

(V) an E type viscosity at from 50 to 100°C after coating to a thickness of 50 μm and being subjected to a heat treatment at from 50 to 85°C for 20 minutes of from 5 to 5,000 Pa.s.

3. A sealant composition for a plastic liquid crystal display cell, comprising:

a two-component epoxy resin composition consisting of a base resin liquid containing the following (1) and (3) to (6) and a curing agent liquid containing the following (2A) or a mixture of the following (2A) and (3), wherein

the two-component epoxy resin composition is obtained from a two-component mixture of the base resin liquid and the curing agent liquid contains the following (1) to (6):

(1) from 15 to 84% by weight of a liquid epoxy resin having from 1.7 to 6 in weight average of epoxy groups in one molecule and an ionic conductivity of an aqueous solution obtained by extraction separation by contact mixing with 10 times by weight of pure water at from 40 to 80°C of 2 mS/m or less,

(2A) from 10 to 50% by weight of a curing agent containing one or a mixture of two or more selected from (2A-1) a tetrafunctional mercapto compound or (2A-2) a modified polymercapto derivative, having an ionic conductivity of an aqueous solution obtained by extraction separation by contact mixing with 10 times by weight of pure water at from 40 to 80°C of 0.6 mS/m or less,

(3) from 0.01 to 15% by weight of a curing accelerator,

(4) from 5 to 50% by weight of an inorganic filler,

(5) from 0.1 to 5% by weight of a silane coupling agent,
and

(6) from 1 to 25% by weight of rubbery polymer fine particles having a softening temperature of 0°C or less and an average particle diameter of primary particles of from 0.01 to 5 μm .

4. The sealant composition for a plastic liquid crystal display cell of claim 3, wherein the tetrafunctional mercapto compound (2A-1) is pentaerythritol tetrakis(3-mercaptopropionate), and the modified polymer mercapto derivative (2A-2) is a modified polymer mercapto derivative obtained by reacting 1 equivalent in terms of active hydrogen of pentaerythritol tetrakis(3-mercaptopropionate) with from 0.01 to 0.3 equivalent in terms of active isocyanate group of a diisocyanate compound and/or an isocyanate prepolymer thereof.

5. A sealant composition for a plastic liquid crystal display cell comprising a one-component epoxy resin composition containing the following (1) to (6):

(1) from 15 to 84% by weight of an epoxy resin having from 1.7 to 6 in weight average of epoxy groups in one molecule and an ionic conductivity of an aqueous solution obtained by extraction separation by contact mixing with 10 times by weight

of pure water at from 40 to 80°C of 2 mS/m or less,

(2B) from 10 to 50% by weight of a curing agent containing one or a mixture of two or more selected from (2B-1) a micro-encapsulated imidazole compound and (2B-2) a methyl methacrylate adduct of an alicyclic diamine, having an ionic conductivity of an aqueous solution obtained by extraction separation by contact mixing with 10 times by weight of pure water at from 40 to 80°C of 0.6 mS/m or less,

(3) from 0.01 to 15% by weight of a curing accelerator,

(4) from 5 to 50% by weight of an inorganic filler,

(5) from 0.1 to 5% by weight of a silane coupling agent,
and

(6) from 1 to 25% by weight of rubbery polymer fine particles having a softening temperature of 0°C or less and an average particle diameter of primary particles of from 0.01 to 5 μm .

6. The sealant composition for a plastic liquid crystal display cell of any one of claims 3 to 5, wherein

(I) an aqueous solution obtained by mixing the composition and 10 times by weight the composition of pure water at from 40 to 80°C has an ionic conductivity of 1 mS/m or less,
and

a cured product of the composition has

(II) a water vapor permeability at 60°C passing a cured

film of the composition having a thickness of 100 μm of less than 200 $\text{g/m}^2 \cdot 24\text{hrs}$,

(III) a heat deformation temperature (T_g) of a cured product of the composition in a range of from 0 to 85°C, and

(IV) a storage modulus under room temperature of a cured product of the composition in a range of from 0.5×10^4 to 1×10^6 Pa.

7. The sealant composition for a plastic liquid crystal display cell of any one of claims 3 to 5, further comprising:

(V) an E type viscosity at from 50 to 100°C after coating to a thickness of 50 μm and being subjected to a heat treatment at from 50 to 85°C for 20 minutes of from 5 to 5,000 Pa·s.

8. The sealant composition for a plastic liquid crystal display cell of any one of claims 3 to 7, wherein the epoxy resin (1) is a mixed composition of (1-1) an aliphatic and/or alicyclic epoxy resin and (1-2) an aromatic epoxy resin, the aliphatic and/or alicyclic epoxy resin (1-1) is one or a mixture of two or more selected from higher alcohol monoglycidyl ether, polyoxyalkylene glycol diglycidyl ether, 1,6-hexanediol diglycidyl ether, neopentyl glycol diglycidyl ether and glycerin triglycidyl ether, and the aromatic epoxy resin (1-2) is one or a mixture of two or more selected from the group consisting of a bisphenol A type epoxy resin or an alkylene

oxide adduct type epoxy resin thereof, a bisphenol F type epoxy resin or an alkylene oxide adduct type epoxy resin thereof, a bisphenol S type epoxy resin, and a bisphenol AD type epoxy resin.

9. The sealant composition for a plastic liquid crystal display cell of any one of claims 3 to 8, wherein the curing accelerator (3) is at least one selected from an alkyl urea derivative, trisdimethylamino methylphenol salt and 1,8-diazabicyclo(5,4,0)undecene hepta-salt.

10. The sealant composition for a plastic liquid crystal display cell of claim 9, wherein the alkyl urea derivative is at least one selected from 3-(p-chlorophenyl)-1,1-dimethyl urea, 3-(o,p-dichlorophenyl)-1,1-dimethyl urea, 2,4-(bis(1,1-dimethyl urea))toluene and 2,6-(bis(1,1-dimethyl urea))toluene.

11. The sealant composition for a plastic liquid crystal display cell of any one of claims 3 to 10, wherein the rubbery fine particles (6) have a primary particle diameter of from 0.1 to 1 μm and are crosslinked rubbery polymer particles.

12. The sealant composition for a plastic liquid crystal display cell of any one of claims 3 to 11, wherein at least

a part of the inorganic filler (4) is a graft product with the epoxy resin (1) and/or the silane coupling agent (5), and the graft product has a graft ratio expressed by a weight increasing rate obtained by a repeating solvent washing method of from 1 to 50 parts by weight in total of the epoxy resin (1) and the silane coupling agent (5) per 100 parts by weight of the inorganic filler (4).

13. A process for producing a plastic liquid crystal display cell comprising:

a coating step of coating the sealant composition for a plastic liquid crystal display cell of any one of claims 1 to 12 on one substrate of a pair of substrates for a plastic liquid crystal display cell,

an adhering step of positioning the one substrate and the other substrate and adhering the pair of substrates for a plastic liquid crystal display cell,

a sealant composition curing step of subjecting the pair of substrate adhered to each other in the adhering step to a heat pressing treatment at from 60 to 100°C to cure the sealant composition for a plastic liquid crystal display cell, and

a liquid crystal charging step of charging a liquid crystal to a space surrounded by the pair of substrates for a plastic liquid crystal display cell and the sealant composition for a plastic liquid crystal display cell therebetween.

14. A plastic liquid crystal display cell obtained by the process for producing a plastic liquid crystal display cell of claim 13.